

# WST2

WSDOT's Staff Development and the WST2 Center present:

## ***General River Mechanics For Highway Design***

**May 2-6, 2005 (#996)**

**Westwood Retreat, 6015 30th Avenue SE,  
Lacey, WA 98503 (360) 491-0195**

**June 20-24, 2005 (#997)**

**WSDOT Eastern Region Headquarters,  
2714 N. Mayfair Street, Spokane, WA 99207  
(509) 324-6000**

(The phone numbers shown above are to be used in case of emergency to contact a student in the class.)

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**Cost: \$320**

**Time: 8:00 am to 5:00 pm** (Begins at 1:00 pm on the first day and ends at noon on the last day.)

**Class Size: 30** (WSDOT 15, Local Agencies 15)

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### ***Target Audience***

Environmental Specialists and Transportation Engineers

### ***Course Description***

This course is an introduction to mechanics of fluvial systems. Participants will study the interaction between geology, hydrology, and hydraulics to develop an understanding of how and why river systems erode the land around them. Using this information, methods of managing and correcting stream bank erosion are described. Methods of controlling erosion that have minimal negative impact and sometimes even beneficial impact on the fish habitat in the river system are presented.

### ***Course Objectives***

Upon completion of this course participants will be able to:

1. Relate the large-scale geologic processes shaping the earth's surface to the development of stream shapes.
2. Identify the interrelationships between river geomorphology and hydraulic design.
3. Explain the transport of water and sediment by streams.
4. Outline basic concepts relevant to sediment transport including properties of sediment, techniques for sampling and analyzing sediment, and application of open channel flow and stream hydrology principles to sediment transport analysis.
5. Outline the effects of structures and bank protection on sediment transport and predict how highways near rivers might be affected.
6. Describe the effects of bridges/piers on wood/sediment transport.
7. Outline sediment transport analyses in planning and review of stream restoration projects.
8. Explain the basic concepts for computer modeling and sediment transport simulation.
9. Determine stream equilibrium and geologic conditions based on stream patterns.
10. Relate the concepts of total stream analysis to site-specific problems.



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11. Compare various in-stream structures and dikes.
12. Explain and evaluate site-specific problems and conditions associated with: bridges, culverts and roads; gravel mining; stream diversions; channel modifications; fish passages; and fords.
13. Determine the expected response for various channel changes.
14. Locate areas of streambank erosion or potential stream bank erosion.
15. Determine the causes of streambank erosion.
16. Develop environmentally friendly cost effective methods to control the erosion.

## **Instructors**

**Jeffrey B. Bradley, Ph.D., P.E.** Dr. Bradley is President of WEST Consultants, Inc. He has 28 years of experience in teaching, research, and consulting. He has been directly involved in a large number and variety of hydrologic, hydraulic, geomorphic, and sediment transport projects for transportation projects throughout Washington State and the Pacific Northwest. His work has included hundreds of hydraulic design and scour assessments for bridge engineering projects, geomorphic and channel migration studies, bank erosion protection, fish passage at culverts, and habitat restoration projects. Dr. Bradley conducts technical training courses on issues of hydraulic modeling, bridge scour analysis, sediment transport, culvert design, and streambank erosion control. Dr. Bradley was formerly with the Corps of Engineers and Colorado State University.

**Peter C. Klingeman, Ph.D., P.E.** Dr. Klingeman has over 40 years of experience in teaching, research, and consulting activities. His experience covers a wide range of water resources topics pertinent to transportation projects, including hydrology, river hydraulics, sediment transport, channel morphology, erosion control and bank protection methods, hydraulic structure design, fish habitat, fish passage at culverts, and environmental impact assessment and mitigation. His experience includes work in rivers and estuaries throughout the Pacific Northwest, neighboring states, and international locations. Dr. Klingeman is Professor Emeritus of Civil Engineering at Oregon State University and has taught at the University of California at Berkeley, North Dakota State University and Universidad Catolica de Chile.

## **Questions?**

WSDOT: Contact Fred Atkinson at (360) 705-7066 or [AtkinsF@wsdot.wa.gov](mailto:AtkinsF@wsdot.wa.gov)

Local Agencies: Contact Laurel Gray at (360) 705-7355 or [GrayL@wsdot.wa.gov](mailto:GrayL@wsdot.wa.gov).

## **Registration**

WSDOT employees should register through ATMS (Course Code CSD). Local agencies please register on-line using this link: [On-line Registration Form](#). Fill in your information\*, select your class from the list, then press "Submit." You will receive an e-mail notification with driving directions to the training site when we process your request. **If you do not receive this e-mail notification within a day or two, you may not be registered and should contact us by phone.**

Confirmation letters and invoices will be mailed three weeks before the class. If you are unable to attend, someone else from your agency may attend in your place. To cancel your registration, or for assistance with registration, e-mail [wst2center@wsdot.wa.gov](mailto:wst2center@wsdot.wa.gov) or [schmidw@wsdot.wa.gov](mailto:schmidw@wsdot.wa.gov) or phone (360) 705-7386.

\* A "unique identifier" for each student is now required when registering on-line. It may contain 3 to 8 alpha and/or numeric characters. You might use the last four digits of your phone number or social security number, or any combination of letters and numbers, but please make it something you will remember. Our computer will match your last name with your identifier to automatically and quickly register you into a class (providing there is space available).



## ***Motels***

### ***Lacey***

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**Holiday Inn Express**

4704 Park Center Ave NE  
Lacey WA 98516  
(360) 412-1200

**Comfort Inn**

4700 Park Center Ave. NE  
Lacey WA 98516  
360) 456-6300

**AmeriTel Inn**

4520 Martin Way E.  
Olympia, WA 98516  
(360) 459-8866  
1-800-600-6001

### ***Spokane***

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**Red Lion Hotel at the Park**

303 W. North River Drive  
Spokane, WA 99201  
1-800-843-4667 or (509) 326-8000

**Howard Johnson**

211 S Division St.  
Spokane, WA 99202  
(509)-838-6630

**Holiday Inn Express**

801 N. Division Street  
Spokane, WA 99202  
(509) 328-8505

**Comfort Inn**

7111 N Division St.  
Spokane, WA 99208  
1-800-221-2222 or 509-467-7111

(Disability accommodations provided upon request.)

### **Washington State Technology Transfer's Web Page**

[www.wsdot.wa.gov/TA/T2Center/t2hp.htm](http://www.wsdot.wa.gov/TA/T2Center/t2hp.htm)

